Department of the Environment

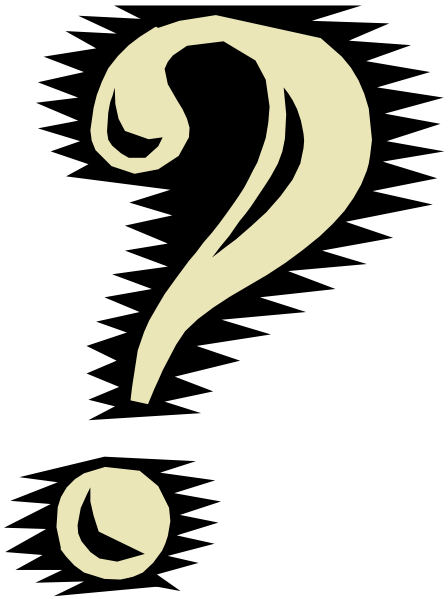
THE SANITARY SURVEY

REQUIRED CHANGES

PER THE GROUNDWATER RULE

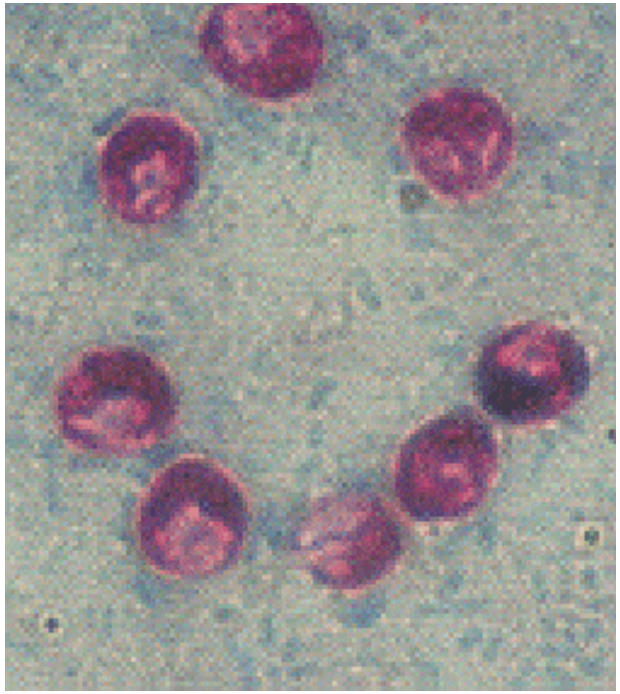
September 25, 2008

MDE's implementation of GWR is not set in stone!



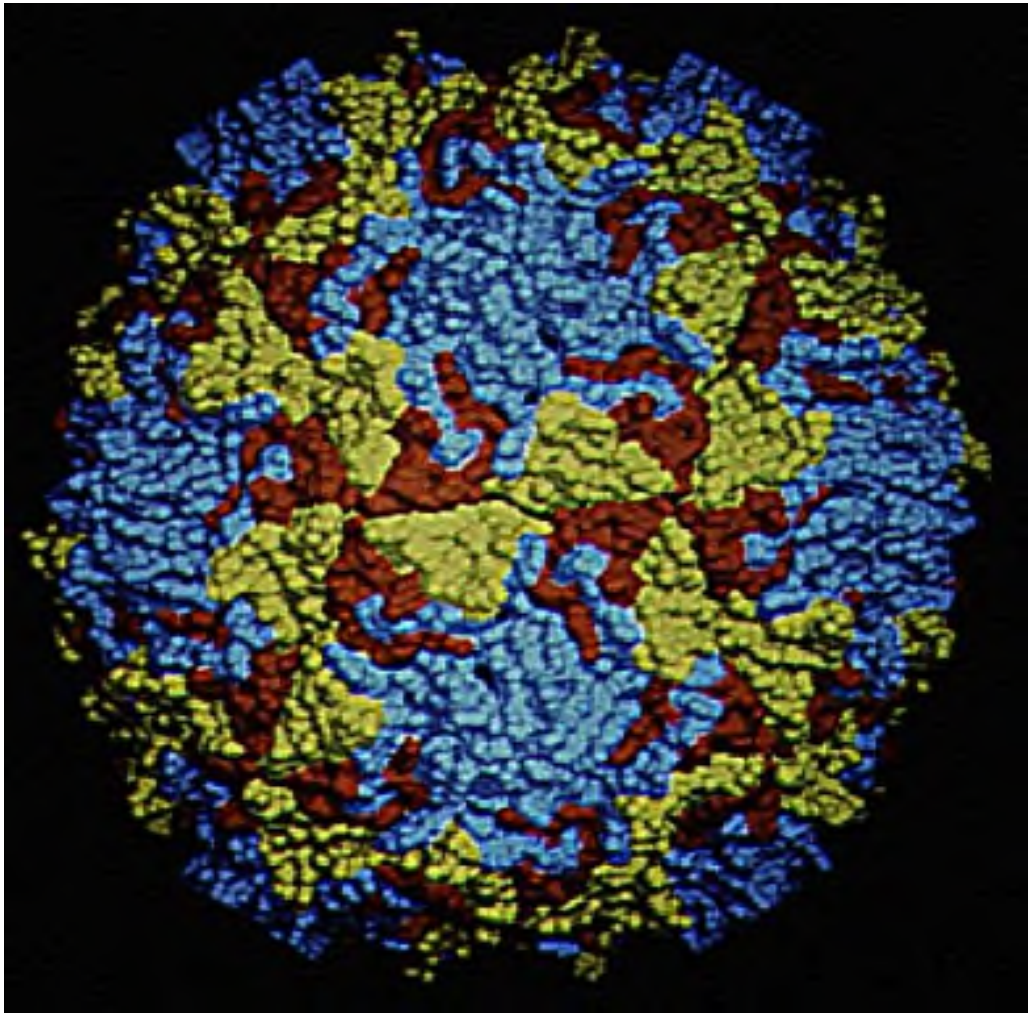
TCR & GWUDI

- Bacteria varies 0.5 - 10 micrometers
- Cryptosporidium oocysts 4 - 6 micrometers
- Giardia oocysts 8 - 20 micrometers



GRW FOCUSES ON VIRUSES

- Hepatitis C
- Coxsackie
- Echovirus
- Rotavirus
- Norwalk
- 20 – 40 nm



SIZE MATTERS

- 1 micrometer = 1,000 nanometers,
- Average virus 0.02 – 0.04 micrometers
  - Bacteria varies 0.5 - 10 micrometers
  - Cryptosporidium oocysts 4 - 6 micrometers
  - Giardia oocysts 8 - 20 micrometers

TOPICS

- GWR Requirements / Inspection
- Changes to TNC Inspection Form
- Water Supply's Use of Information Provided

REQUIREMENTS OF GWR

- 8 elements of sanitary survey
- Focus on deficiencies during sanitary survey
- Raw sample tap available
- Daily monitoring of chlorine residual, if applicable
- Chlorine contact time, if applicable

MDE 8 ELEMENTS OF SANITARY SURVEY

- Source
- Treatment
- Distribution System
- Storage
- Pumps & Controls
- Monitoring, Reporting & Data Verification
- Management & Operation
- Operator Compliance

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MDE 8 ELEMENTS OF SANITARY SURVEY

"EPA recognizes some systems may not have all 8 components; some TNCs may not have storage or certified operators."

- GWR Register

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DEFINITION OF SIGNIFICANT DEFICIENCY

"Includes, but not limited to,

Defect in design, operation, or maintenance

Or **failure or malfunction** of sources, treatment, storage, or distribution system

That the State determines to be **causing,**

Or has the **potential for causing**,

The **introduction of contamination** into the water delivered to consumers."

– GWR Register

SIGNIFICANT DEFICIENCY

- Deficiencies noted during sanitary survey
- GWR requires “complete corrective action within 120 days” after notification
- Failure to correct deficiency will be a violation
- List of potential deficiencies at back of handouts

DEFECT: SOURCE

- Near source of fecal contamination
- In flood zone
- Improper construction
  - Surface
  - Subsurface

DEFECT: WELL

- Located in pit
- Cap missing
- Hole in casing or cap

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DEFECT: WELL

- Cap loose
- Hole in conduit
- Conduit not flush with cap
- Well pad damaged (esp non-grouted wells)

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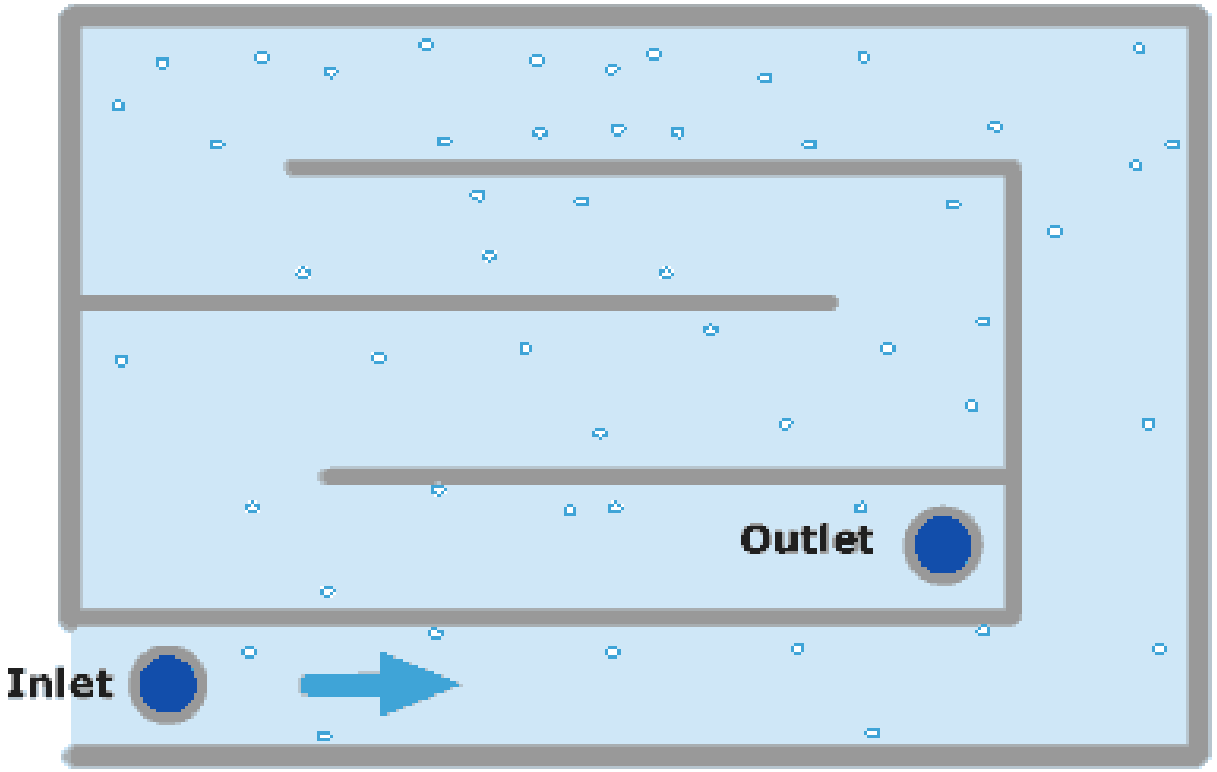
DEFECT: WELL

- Spring box poorly constructed
  - Surface runoff
- Spring box subject to flooding
- Look for fish, salamanders, etc

DEFECT: TREATMENT

- Chlorine tank empty
- Chlorine residual < 0.2 mg/L
- Inadequate contact time
- Cross connection on backwash line
- Cross connection with treatment system

BAFFLES: EXAMPLE OF CONTACT TIME



SODIUM HYPOCHLORITE

CALCIUM HYPOCHLORITE

GAS CHLORINE

DEFECT: FINISHED STORAGE

- Tank in poor condition
  - Leaking
  - Rusting
- Lacks screening on overflow/ drain/ vent
- Tank roof/ cover in poor condition

SIZING A TANK

- **Use**
  - Volume
  - Pressure

- **Size based upon**
  - Population served
  - Peak demand
  - Capacity of pumps used (source & distribution)
  - Fire flow

MDE BLADDER TANKS

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HYDROPNEUMATIC TANK

HYDROPNEUMATIC TANK

ELEVATED TANK

DEFECT: PUMPS/ CONTROLS

- Inadequate booster pump capacity
- Inadequate maintenance
- Inoperable control system

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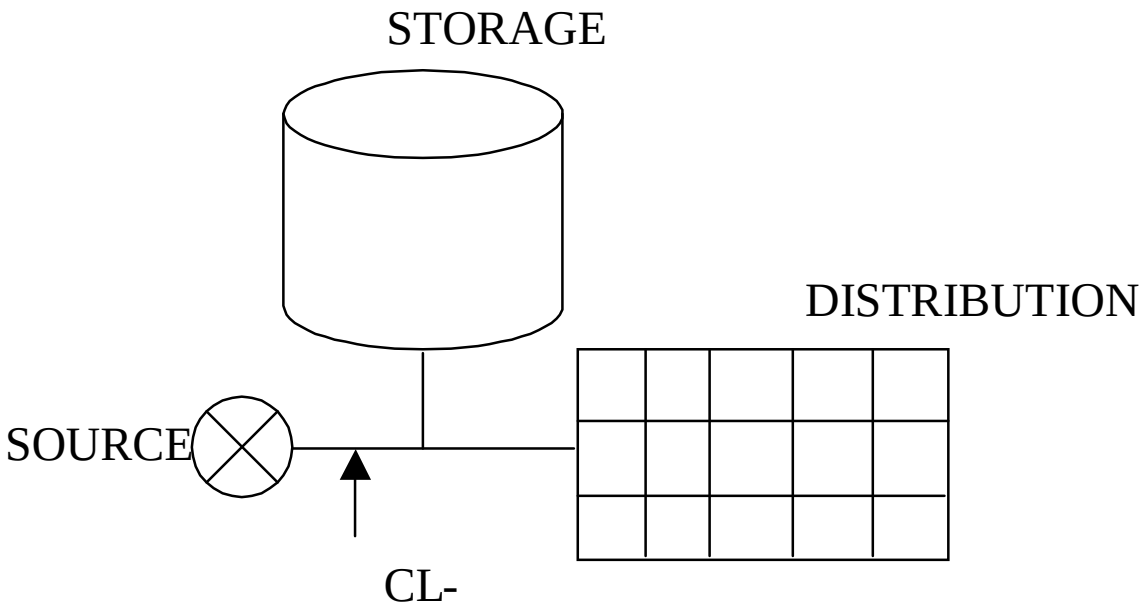
DEFECT: DISTRIBUTION

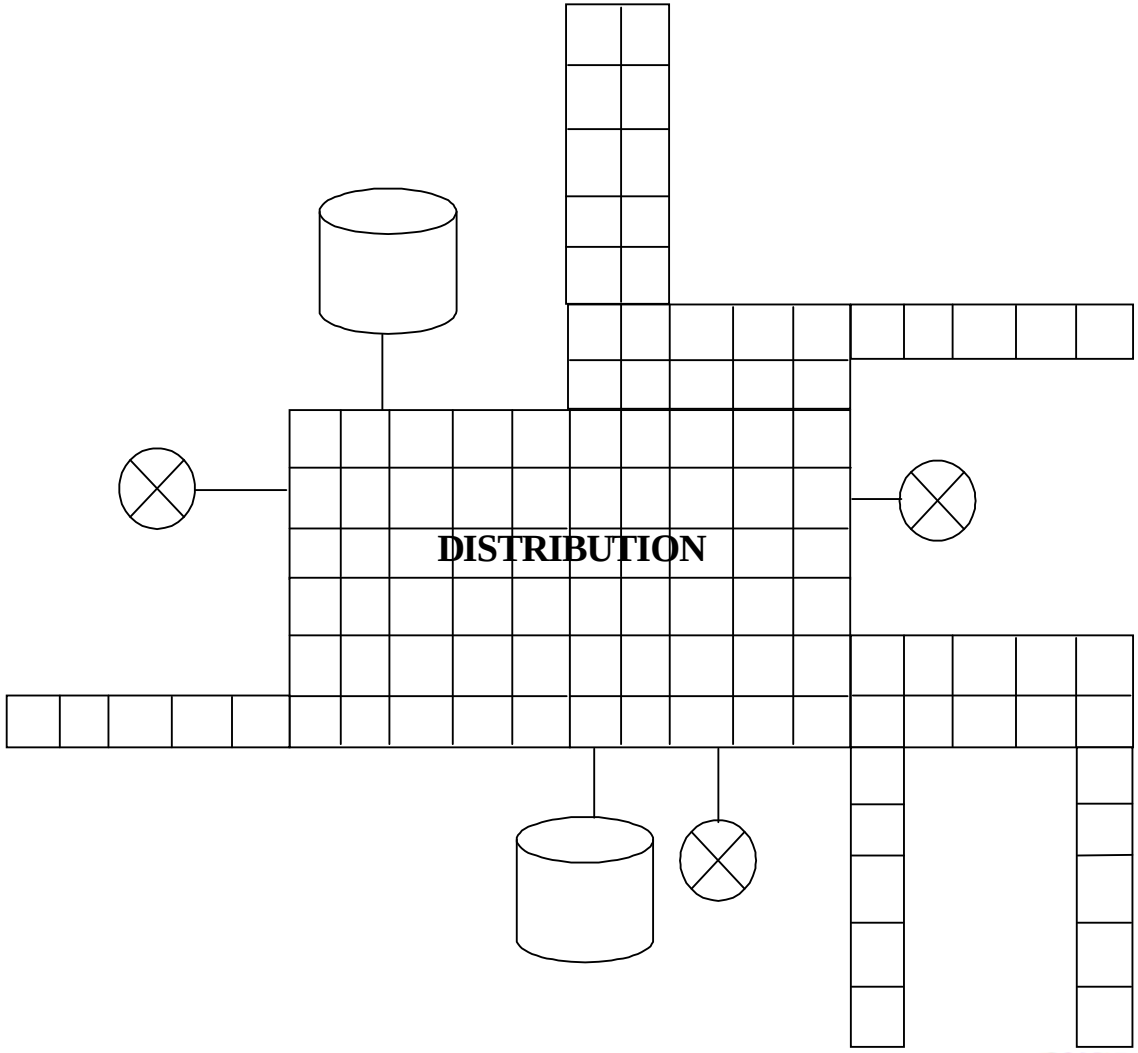
- Inadequate disinfection residual
- Cross connections (negative pressure)
- Line breaks

SIMPLE DISTRIBUTION



COMPLEX DISTRIBUTION

- Pressure issues
- Dead ends
- Main breaks



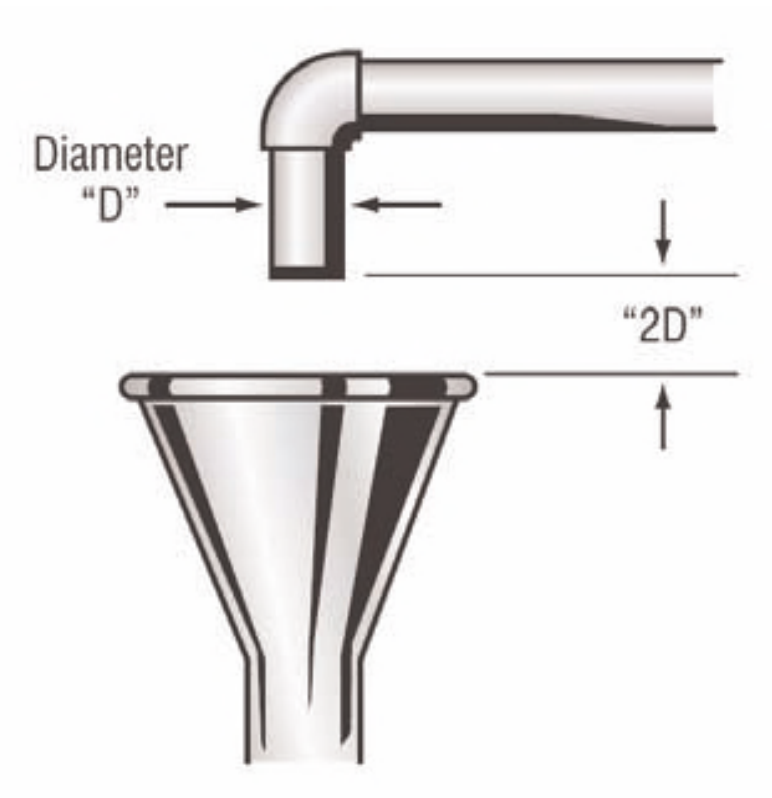
CROSS CONNECTIONS

A direct or indirect link between potable water and a source of pollution

- Plumbing installer unaware
- Convenient but dangerous
- Inadequate protection

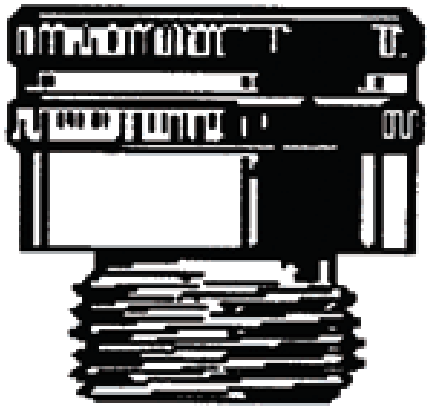
Pressure (polluted source) > Pressure (potable water)

CROSS CXN DEVICE: AIR GAP



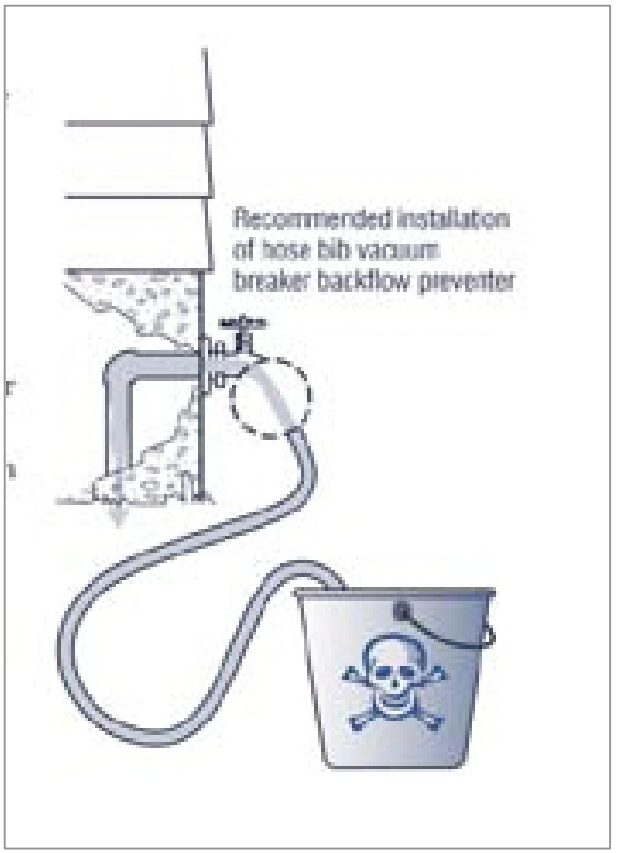
- **Air gap 2x pipe diameter**
- **Always at least 1 inch**
- Most effective/ no fail
- Non mechanical
- Common
- Backwash line

CROSS CXN DEVICE: AVB



- **Atmospheric vacuum breaker**
- Simple, inexpensive
- For backsiphonage only
- Install 6” higher than outlet

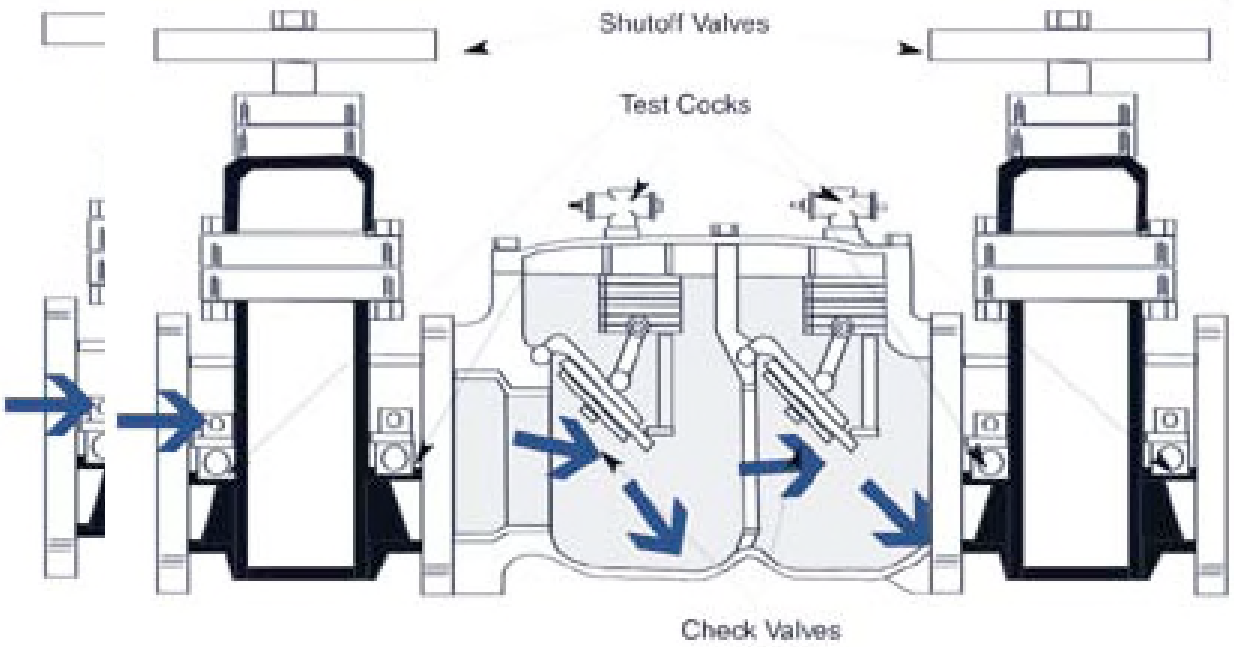
CROSS CXN DEVICE: AVB



Two situations for atmospheric vacuum breakers

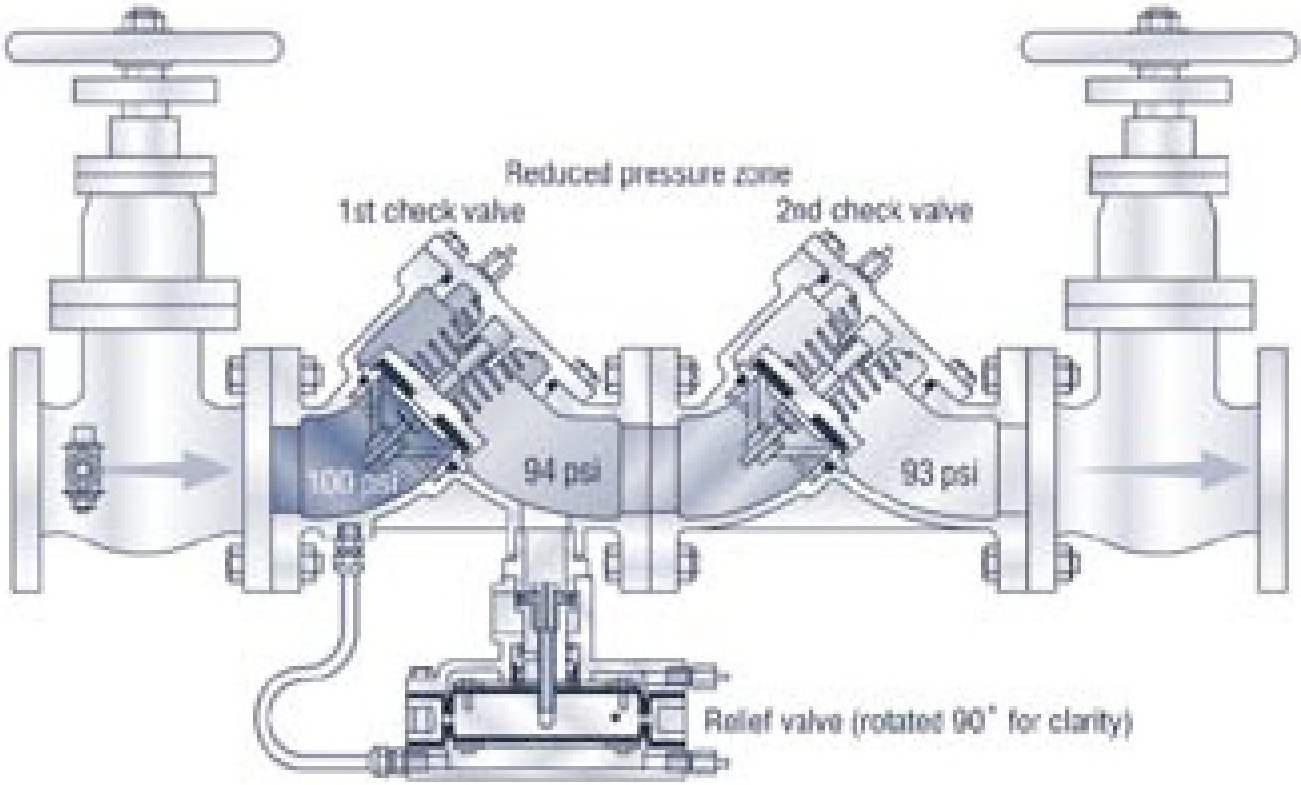
“hose bib vacuum breakers”

CROSS CXN DEVICE: DOUBLE CHECK VALVE



- A single check valve can foul or break!
- Medium Hazard
  - Food processing
  - Residential water meters

CROSS CXN DEVICE: RPZ/ RCBP



Reduced Pressure Zone

Backflow Preventer

CROSS CXN DEVICE: RPZ

- Pressure relief valve vents to atmoshpere
- Maximum Protection for High Hazards
  - Industry
  - Car wash
  - High School Boilers

DEFECT: MONITORING & REPORTING

- Fail to properly monitor water quality
- Fail to report
  - Initial low residual
  - Follow-up residual sampling
- Inadequate record keeping
- REQUIREMENTS PENDING

FREE CHLORINE RESIDUAL

0.2 mg/L - 4.0 mg/L

- **Minimum residual**
  - At furthest point in distribution
- **Maximum residual**
  - **MCL is 4.0 mg/L**
  - **Colorimeters usually monitor to 2.2 mg/L**

FREE CHLORINE RESIDUAL

- **Measure with colorimeter**
  - Color wheel subjective
- **Tests used**
  - DPD (diethyl-p-phenylenediamine)
  - SNORT (Stabilized Neutral Orthotolidine method)

DEFECT: OPERATION & MANAGEMENT

- Interruption to service
  - Unreliable source
  - Lack of auxiliary power
- Inadequate follow-up to deficiencies noted in previous survey
- REQUIREMENTS PENDING

DEFECT: OPERATOR COMPLIANCE

- Operator not certified
  - Certification not required for TNCs currently
- Operator not trained
  - Recent development of class G training
- REQUIREMENTS PENDING

CHANGES TO INSPECTION FORM

- Expanded size
  - Two pages
  - front & back
- Expanded treatment options
  - Treatment
  - Purpose
- Summary of deficiencies found
  - Dates for correction?
- REQUIREMENTS PENDING

WHAT DOES MDE DO WITH THIS STUFF??

- Compiled in database
- Updates to EPA
- Future GW quality assessments
  - Previous “Source Water Protection”

Maryland Department of the Environment

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